

Canadian Journal of Earth Sciences

Journal canadien des sciences de la terre

Volume 21 • 1984

Editor W. G. E. CALDWELL **Directeur scientifique**

Assistant to the Editor P. J. McHUGHEN **Adjointe au directeur scientifique**

Associate Editors/Directeurs scientifiques associés

W. R. A. BARAGAR
C. BEAUMONT
M. J. BERRY
C. BROOKS
R. L. CARROLL

H. CHARLESWORTH
J. I. CLAGUE
D. J. DUNLOP
E. FROESE
C. HILLAIRE-MARCEL
V. F. HOLLISTER

J. W. KRAMERS
S. B. MCCANN
J. W. H. MONGER
D. J. W. PIPER
D. F. STRONG

PUBLISHING DEPARTMENT SERVICE DE PUBLICATION
at the National Research Council of Canada du Conseil national de recherches du Canada

Editor-in-chief	C. T. BISHOP	Directeur général
Assistant Editor-in-chief	P. A. REDHEAD	Directeur général adjoint
Manager	B. E. DREW	Directrice administrative
Publishing Supervisor	S. E. JENNESS	Préposé de la publication
Senior Publication Officer	F. M. KAVCIC	Agent supérieur à la publication
Publication Officer	S. A. DILABIO	Agent à la publication

Published by the
National Research Council
of Canada

Publié par le
Conseil national de recherches
du Canada

CONTENTS/SOMMAIRE

JANUARY/JANVIER

Instructions to authors	iii
Recommandations aux auteurs	v
 ARTICLES	
Thomas F. Pedersen Interstitial water metabolite chemistry in a marine mine tailings deposit, Rupert Inlet, B.C.	1
H. G. Miller and J. A. Wright Gravity and magnetic interpretation of the Deer Lake basin, Newfoundland	10
M. S. King The influence of clay-sized particles on seismic velocity for Canadian Arctic permafrost	19
D. Cataliotti-Valdina et B. F. Long Évolution estuarienne d'une rivière régularisée en climat sub-boréal: la rivière aux Outardes (côte nord du golfe du St-Laurent, Québec)	25
Neil A. Mathieson and C. Jay Hodgson Alteration, mineralization, and metamorphism in the area of the East South "C" ore zone, 24th level of the Dickenson mine, Red Lake, northwestern Ontario	35
G. A. Spiers, M. J. Dudas, K. Muehlenbachs, and L. W. Turchenek Mineralogy and oxygen isotope geochemistry of clays from surficial deposits in the Athabasca Tar Sands area	53
L. M. Parson, D. G. Masson, R. G. Rothwell, and A. C. Grant Remnants of a submerged pre-Jurassic (Devonian?) landscape on Orphan Knoll, offshore eastern Canada	61
J. K. Böhlke, J. C. Alt, and K. Muehlenbachs Oxygen isotope – water relations in altered deep-sea basalts: low-temperature mineralogical controls	67
David A. Mako and Wayne C. Shanks III Stratiform sulfide and barite–fluorite mineralization of the Vulcan prospect, Northwest Territories: exhalation of basinal brines along a faulted continental margin	78
Samuel Y. Johnson Stratigraphy, age, and paleogeography of the Eocene Chuckanut Formation, northwest Washington	92
William M. Last Sedimentology of playa lakes of the northern Great Plains	107
 DISCUSSION	
R. Garth Platt and Roger H. Mitchell Rb-Sr geochronology of the Coldwell Complex, northwestern Ontario, Canada: Reply	126
 COMMUNICATION	
J. P. Hodych, R. R. Pätzold, and K. L. Buchan Paleomagnetic dating of the transformation of oolitic geothite to hematite in iron ore	127

FEBRUARY/FÉVRIER

 ARTICLES	
Brian Jones and G. M. Narbonne Environmental controls on the distribution of <i>Atrypoidea</i> species in Upper Silurian strata of arctic Canada	131
V. K. Gupta and R. B. Barlow A detailed gravity profile across the English River Subprovince, northwestern Ontario	145
N. F. McIntyre Cryconite hole thermodynamics	152
Brian L. Cousens, R. L. Chase, and J.-G. Schilling Basalt geochemistry of the Explorer Ridge area, northeast Pacific Ocean	157
Hugh McLean and J. R. Hein Paleogene geology and chronology of southwestern Umnak Island, Aleutian Islands, Alaska	171
Trevor Lewis Geothermal energy from Penticton Tertiary outlier, British Columbia: an initial assessment	181
Thomas B. Kellogg Paleoclimatic significance of subpolar foraminifera in high-latitude marine sediments	189
R. K. Pickerill, T. L. Harland, and D. Fillion <i>In situ</i> lingulids from deep-water carbonates of the Middle Ordovician Table Head Group of Newfoundland and the Trenton Group of Quebec	194
James D. Howard and Robert W. Frey Characteristic trace fossils in nearshore to offshore sequences, Upper Cretaceous of east-central Utah	200
Léopold Gélinas, Pierre Trudel, and Claude Hubert Chemostratigraphic division of the Blake River Group, Rouyn-Noranda area, Abitibi, Quebec	220
Garry K. C. Clarke, Sam G. Collins, and David E. Thompson Flow, thermal structure, and subglacial conditions of a surge-type glacier	232
Chen Xu The Silurian graptolite zonation of China	241

NOTE

- Richard C. Fox** *Ichthyornis* (Aves) from the early Turonian (Late Cretaceous) of Alberta

258

DISCUSSIONS

- John J. Walsh** Archean mafic metavolcanics from the Rouyn-Noranda district, Abitibi Greenstone Belt, Quebec. I. Mobility of the major elements: Discussion 261
- L. Gélinas and P. Trudel** Archean mafic metavolcanics from the Rouyn-Noranda district, Abitibi Greenstone Belt, Quebec. I. Mobility of the major elements: Reply 263

MARCH/MARS

ARTICLES

- Catherine J. Hickson and J. G. Souther** Later Cenozoic volcanic rocks of the Clearwater – Wells Gray area, British Columbia 267
- Brooks B. Ellwood and S. George Pemberton** Some magnetic properties of Athabasca Oil Sand samples, Alberta, Canada 278
- Godfrey S. Nowlan and J. Geoffrey Thurlow** Middle Ordovician conodonts from the Buchans Group, central Newfoundland, and their significance for regional stratigraphy of the Central Volcanic Belt 284
- Garry K.C. Clarke and Sam G. Collins** The 1981–1982 surge of Hazard Glacier, Yukon Territory 297
- T. P. Ding and H. P. Schwarcz** Oxygen isotopic and chemical compositions of rocks of the Sudbury Basin, Ontario 305
- Serge Payette et Francis Boudreau** Évolution postglaciaire de hauts sommets alpins et subalpins de la Gaspésie 319
- M. K. Prabhu and G. R. Webber** Origin of quartzofeldspathic gneisses at Montauban-les-Mines, Quebec 336
- Frederick A. Cook** Harmonic distortion on a seismic reflection profile across the Quebec Appalachians: relation to Bouguer gravity and implications for crustal structure 346
- Maurice K. Seguin et Michel Allard** La répartition du pergélisol dans la région du détroit de Manitounek, côte est de la mer d'Hudson, Canada 354

NOTES

- Michael Clayton Wilson and Leonard V. Hills** Holocene white-tailed deer (*Odocoileus virginianus*) from the foothills northwest of Calgary, Alberta, Canada 365
- John K. Park** Paleomagnetism of the Mudcracked formation of the Precambrian Little Dal Group, Mackenzie Mountains, Northwest Territories, Canada 371
- D. Elthon, R. Hanson, R. Allen, and H. Vergara** Unusual ocellar textures in diabases from the Sarmiento ophiolite complex, Chile 376
- JoAnne Nelson and John G. Payne** Paleozoic volcanic assemblages and volcanogenic massive sulfide deposits near Tulsequah, British Columbia 379

APRIL/AVRIL

Dates of issue, Vol. 20, 1983/Dates de publication, vol. 20, 1983

i

ARTICLES

- M. P. Cecile, W. D. Goodfellow, L. D. Jones, H. R. Krouse, and M.A. Shakur** Origin of radioactive barite sinter, Flybye springs, Northwest Territories, Canada 383
- Michael P. Searle** Alkaline peridotite, pyroxenite, and gabbroic intrusions in the Oman Mountains, Arabia 396
- G. V. Lynch and C. Pride** Evolution of a high-level, high-silica magma chamber: the Pattison pluton, Nisling Range alaskites, Yukon 407
- Kent C. Condie and Craig A. Shadel** An early Proterozoic volcanic arc succession in southeastern Wyoming 415
- Roger H. Mitchell and R. Garth Platt** The Freemans Cove volcanic suite: field relations, petrochemistry, and tectonic setting of nepheline–basanite volcanism associated with rifting in the Canadian Arctic Archipelago 428
- R. F. Emslie, W. D. Loveridge, and R. D. Stevens** The Mealy dykes, Labrador: petrology, age, and tectonic significance 437
- A. I. Zolnai, R.A. Price, and H. Helmstaedt** Regional cross section of the Southern Province adjacent to Lake Huron, Ontario: implications for the tectonic significance of the Murray Fault Zone 447
- A. Turek, Patrick E. Smith, and W. R. Van Schmus** U-Pb zircon ages and the evolution of the Michipicoten plutonic–volcanic terrane of the Superior Province, Ontario 457
- D. A. Spears and P. McL. D. Duff** Kaolinite and mixed-layer illite–smectite in Lower Cretaceous bentonites from the Peace River coalfield, British Columbia 465
- D. R. Issler** Calculation of organic maturation levels for offshore eastern Canada—implications for general application of Lopatin's method 477

Jean H. Bédard, Donald M. Francis, Andrew J. Hynes, and Serge Nadeau	Fractionation in the feeder system at a Proterozoic rifted margin	489
--	---	-----

NOTES

Bernard L. Mamet and Samuel J. Nelson	Stratigraphic position of Carboniferous <i>Macgowanella</i> and <i>Sinopora?</i> <i>pascuali</i> , Canadian Cordillera	500
Garry K. C. Clarke and David A. Waldron	Simulation of the August 1979 sudden discharge of glacier-dammed Flood Lake, British Columbia.	502

MAY/MAI

ARTICLES

J. A. R. Blais and R. Ferland	Optimization in gravimetric terrain corrections	505
J. Ross Mackay	The direction of ice-wedge cracking in permafrost: downward or upward?	516
Patricia F. Wonderley and Robert B. Neuman	The Indian Bay Formation: fossiliferous Early Ordovician volcanogenic rocks in the northern Gander Terrane, Newfoundland, and their regional significance	525
S. Handa and P. A. Camfield	Crustal electrical conductivity in north-central Saskatchewan: the North American Central Plains anomaly and its relation to a Proterozoic plate margin	533
W. F. Fahrig, K. W. Christie, K. E. Eade, and S. Tella	Paleomagnetism of the Tulemalu dykes, Northwest Territories, Canada	544
H. C. Grond, S. J. Churchill, R. L. Armstrong, J. E. Harakal, and G. T. Nixon	Late Cretaceous age of the Hutshi, Mount Nansen, and Carmacks groups, southwestern Yukon Territory and northwestern British Columbia	554
A. A. Levinson, C. J. Bland, and J. R. Dean	Uranium series disequilibrium in young surficial uranium deposits in southern British Columbia	559
D. A. Archibald, T. E. Krogh, R. L. Armstrong, and E. Farrar	Geochronology and tectonic implications of magmatism and metamorphism, southern Kootenay Arc and neighbouring regions, southeastern British Columbia. Part II: Mid-Cretaceous to Eocene	567
Larry S. Lane	Brittle deformation in the Columbia River fault zone near Revelstoke, southeastern British Columbia	584
Alan M. Jessop, J. G. Souther, Trevor J. Lewis, and A. S. Judge	Geothermal measurements in northern British Columbia and southern Yukon Territory	599

NOTES

George E. Lammers and Harvey R. Young	A conulariid from the Mississippian of Manitoba	609
Graham John Borradaile and W. M. Schwerdtner	Horizontal shortening of upward-facing greenstone structures in the southern Superior Province, Canadian Shield	611
S. L. Fumerton and A. P. Barry	Probable Archean nepheline syenite plutons in the Superior Province adjacent to the Labrador Trough	615

JUNE/JUIN

ARTICLES

Cathy W. Barnosky	Late Pleistocene and early Holocene environmental history of southwestern Washington State, U.S.A.	619
James L. Werle, Mohammed Ikramuddin, and Felix E. Mutschler	Allard stock, La Plata Mountains, Colorado—an alkaline rock-hosted porphyry copper – precious metal deposit	630
H. Baadsgaard, G. L. Cumming, and J. M. Worden	U–Pb geochronology of minerals from the Midwest uranium deposit, northern Saskatchewan	642
G. L. Cumming, D. Krstic, J. M. Worden, and H. Baadsgaard	Isotopic composition of lead in galena and Ni-arsenides of the Midwest deposit, northern Saskatchewan	649
Kevin P. Polan and Colin W. Stearn	The allochthonous origin of the reefal facies of the Stuart Bay Formation (Early Devonian), Bathurst Island, arctic Canada	657
R. J. Granger, D. M. Gray, and G. E. Dyck	Snowmelt infiltration to frozen Prairie soils	669
Charles F. Gower and Victor Owen	Pre-Grenvillian and Grenvillian lithotectonic regions in eastern Labrador—correlations with the Sveconorwegian Orogenic Belt in Sweden	678
Graham J. Borradaile and Don Tarling	Strain partitioning and magnetic fabrics in particulate flow	694
David R. Taylor and Roger G. Walker	Depositional environments and paleogeography in the Albian Moosebar Formation and adjacent fluvial Gladstone and Beaver Mines formations, Alberta	698
Earl E. Davis and Trevor J. Lewis	Heat flow in a back-arc environment: Intermontane and Omineca Crystalline belts, southern Canadian Cordillera	715

NOTES

Osamu Ujike Chemical composition of Archean Pontiac metasediments, southwestern Abitibi Belt, Superior Province	727
Nathan L. Green and Paul Henderson Rare earth element concentrations in Quaternary volcanic rocks of southwestern British Columbia	731

JULY/JUILLET

ARTICLES

W. H. Mathews and R. M. Bustin Why do the Smoking Hills smoke?	737
Pradeep K. Aggarwal, Toshitsugu Fujii, and Bruce E. Nesbitt Magmatic composition and tectonic setting of altered, volcanic rocks of the Fennell Formation, British Columbia	743
A. G. Plint and H. W. van de Poll Structural and sedimentary history of the Quaco Head area, southern New Brunswick	753
Marie-Claude Blanchard, Rebecca A. Jamieson, and Elizabeth B. More Late Devonian – Early Carboniferous volcanism in western Cape Breton Island, Nova Scotia	762
D.F. Strong Rare earth elements in volcanic rocks of the Buchans area, Newfoundland	775
W. R. A. Baragar Pillow formation and layered flows in the Circum-Superior Belt of eastern Hudson Bay	781
Janet Kappmeyer and David V. Wiltschko Quartz deformation in the Marquette and Republic troughs, Upper Peninsula of Michigan	793
P. G. Sly and J. Wyn Prior Late glacial and postglacial geology in the Lake Ontario basin	802
W. K. Fyson Basement-controlled structural fronts forming an apparent major refold pattern in the Yellowknife domain, Slave Province	822
Erik Nielsen, Eugene M. Gryba, and Michael C. Wilson Bison remains from a Lake Agassiz spit complex in the Swan River valley, Manitoba; depositional environment and paleoecological implications	829
Swend Funder and Leifur A. Símonarson Bio- and amino-stratigraphy of some Quaternary marine deposits in West Greenland	843
A. Indares and J. Martignole Evolution of <i>P-T</i> conditions during a high-grade metamorphic event in the Maniwaki area (Grenville Province)	853

NOTE

W. A. M. Jenkins Ordovician rocks in the Eastcan <i>et al.</i> Freydis B-87 and other wells in offshore Atlantic Canada	864
--	-----

AUGUST/AOÛT

ARTICLES

David J. Dunlop Paleomagnetism of Archean rocks from northwestern Ontario: II. Shelley Lake granite, Quetico Subprovince	869
David J. Dunlop, Larry D. Schutts, and Christopher J. Hale Paleomagnetism of Archean rocks from northwestern Ontario: III. Rock magnetism of the Shelley Lake granite, Quetico Subprovince	879
Harold Williams Miogeoclines and suspect terranes of the Caledonian–Appalachian Orogen: tectonic patterns in the North Atlantic region	887
L. W. Sobczak and A. Overton Shallow and deep crustal structure of the western Sverdrup Basin, arctic Canada	902
I. Shetsen Application of till pebble lithology to the differentiation of glacial lobes in southern Alberta	920
James A. Walker, Patrick J. C. Ryall, Marcos Zentilli, Ian L. Gibson, and Jarda Dostal The origin of compositional variation in basalts recovered by submersible drill from Mount Gloscap, Mid-Atlantic Ridge at 36°25'N	934
Po C. Tsui and David M. Cruden Deformation associated with gypsum karst in the Salt River Escarpment, northeastern Alberta	949

NOTES

Kurt Lambeck Subsidence of guyot west of Flores, Azores	960
Erich Dimroth, Guy Archambault, Normand Goulet, Jayanta Guha, and Wulf Mueller A mechanical analysis of the late Archean Gwillim Lake shear belt, Chibougamau area, Quebec	963
A. C. Lenz A new mid-Ludlow graptolite faunule from northern Yukon, Canada	969

SEPTEMBER/SEPTEMBRE

ARTICLES

Garry M. Quinlan and Christopher Beaumont Appalachian thrusting, lithospheric flexure, and the Paleozoic stratigraphy of the Eastern Interior of North America	973
Robert O. van Everdingen Dirty-water events at Rocky Mountain Hot Springs and their correlation with other short-lived phenomena	997
M. O. Jeffries, H. R. Krouse, M. A. Shakur, and S. A. Harris Isotope geochemistry of stratified Lake "A," Ellesmere Island, N.W.T., Canada	1008
Garry Quinlan Postglacial rebound and the focal mechanisms of eastern Canadian earthquakes	1018

Claude Hubert, Pierre Trudel and Léopold Gélinas Archean wrench fault tectonics and structural evolution of the Blake River Group, Abitibi Belt, Quebec	1024
Donald J. White and Ron M. Clowes Seismic investigation of the Coast Plutonic Complex – Insular Belt boundary beneath the Strait of Georgia	1033
Joseph R. Desloges and James S. Gardner Process and discharge estimation in ephemeral channels, Canadian Rocky Mountains	1050
Eric J. Schiller and A. Charles Rowney Stream-bed armouring under known conditions of upstream sediment input	1061

NOTE

Mark Brearley and Christopher M. Scarfe Amphibole in a spinel lherzolite xenolith: evidence for volatiles and partial melting in the upper mantle beneath southern British Columbia	1067
--	------

OCTOBER/OCTOBRE

ARTICLES

W. H. Pollard and H. M. French The groundwater hydraulics of seasonal frost mounds, North Fork Pass, Yukon Territory	1073
S. L. Fumerton, M. R. Stauffer, and J. F. Lewry The Wathaman batholith: largest known Precambrian pluton	1082
David J. Dunlop Paleomagnetism of Archean rocks from northwestern Ontario: IV. Burchell Lake granite, Wawa-Shebandowan Subprovince	1098
C. J. Rebollar, E. R. Kanasewich, and E. Nyland Focal depths and source parameters of the Rocky Mountain House earthquake swarm from digital data at Edmonton	1105
Roger Laurent, Mehmet F. Taner et Jean Bertrand Mise en place et pétrologie du granite associé au complexe orphiolitique de Thetford Mines, Québec	1114
Feiko Kalsbeek, Paul N. Taylor, and Niels Henriksen Age of rocks, structures, and metamorphism in the Nagssugtoqidian mobile belt, West Greenland—field and Pb-isotope evidence	1126
W. H. Mathews and G. E. Rouse The Gang Ranch – Big Bar area, south-central British Columbia: stratigraphy, geochronology, and palynology of the Tertiary beds and their relationship to the Fraser Fault	1132
Glenn W. Berger, D. J. Huntley, and Jerry J. Stipp Thermoluminescence studies on a ¹⁴ C-dated marine core	1145
A. Guy Masson and Brian R. Rust Freshwater shark teeth as paleoenvironmental indicators in the Upper Pennsylvanian Morien Group of the Sydney Basin, Nova Scotia	1151
Elmer L. Matyas Profiles of modern prograding deltas	1156
Brady P. Rhodes and Donald W. Hyndman Kinematics of mylonites in the Priest River “metamorphic core complex,” northern Idaho and northeastern Washington	1161
Andrew V. Okulitch The role of the Shuswap Metamorphic Complex in Cordilleran tectonism: a review	1171

NOTES

Stanley C. Finney and Chen Xu <i>Bergstroemograptus</i> n. gen. <i>crawfordi</i> (Harris) from the Ordovician of western Newfoundland	1194
Joseph Salaj and Nicholaos Solaki The genus <i>Kassabiana</i> Salaj, 1983, from the uppermost Maastrichtian of northeastern Tunisia	1199
Richard C. Fox A primitive, “obtuse-angled” symmetrodont (Mammalia) from the Upper Cretaceous of Alberta, Canada	1204

NOVEMBER/NOVEMBRE

ARTICLES

P. Dobell, A. R. Cameron, and W. D. Kalkreuth Petrographic examination of low-rank coals from Saskatchewan and British Columbia, Canada, including reflected and fluorescent light microscopy, SEM, and laboratory oxidation procedures	1209
D. Craw Tectonic stacking of metamorphic zones in Cheticamp River area, Cape Breton Highlands, Nova Scotia	1229
M. J. Ranger, R. K. Pickerill, and D. Fillion Lithostratigraphy of the Cambrian – Lower Ordovician Bell Island and Wabana groups of Bell, Little Bell, and Kellys islands, Conception Bay, eastern Newfoundland	1245
Richard C. Fox The dentition and relationships of the Paleocene primate <i>Micromomys</i> Szalay, with description of a new species	1262
Richard C. Fox A new species of the Paleocene primate <i>Elpidotarsius</i> Gidley: its stratigraphic position and evolutionary relationships	1268
Ian C. F. Stewart P-wave travel-time residuals in the Newfoundland Appalachians	1278
Cynthia L. Riediger, R. M. Bustin, and G. E. Rouse New evidence for the chronology of the Eurekan Orogeny from south-central Ellesmere Island	1286
Clément Gariépy, Claude J. Allègre, and Jean Lajoie U–Pb systematics in single zircons from the Pontiac sediments, Abitibi greenstone belt	1296
Jean Lajoie and John Ludden Petrology of the Archean Pontiac and Kewagama sediments and implications for the stratigraphy of the southern Abitibi belt	1305

S. A. Bowring, W. R. Van Schmus, and P. F. Hoffman	U-Pb zircon ages from Athapuscow aulacogen, East Arm of Great Slave Lake, N.W.T., Canada	1315
Daniel Biquand	Mise en évidence d'une erreur de fossilisation du champ magnétique terrestre dans un dépôt actuel	1325
NOTES		
Richard C. Fox	<i>Melaniella timosa</i> n. gen. and sp., an unusual mammal from the Paleocene of Alberta, Canada	1335
Norman M. Savage	Devonian conodonts from Jones Island, northwest Washington	1339
David R. Koblik	<i>Archaeotrypa</i> Fritz, 1947 (Cambrian, Problematica) reinterpreted	1343
DECEMBER/DÉCEMBRE		
ARTICLES		
S. P. Colman-Sadd and H. S. Swinden	A tectonic window in central Newfoundland? Geological evidence that the Appalachian Dunnage Zone may be allochthonous	1349
D. H. Loring	Trace-metal geochemistry of sediments from Baffin Bay	1368
Simon A. Smith and Richard N. Hiscock	Latest Precambrian to Early Cambrian basin evolution, Fortune Bay, Newfoundland: fault-bounded basin to platform	1379
Glenn W. Berger	Thermoluminescence dating studies of glacial silts from Ontario	1393
John E. Storey	Fossil mammals of the Southfork Local Fauna (early Chadronian) of Saskatchewan	1400
M. Lamothe	Apparent thermoluminescence ages of St-Pierre Sediments at Pierreville, Quebec, and the problem of anomalous fading	1406
Simon Hanmer	Strain-insensitive foliations in polymineralic rocks	1410
Norman M. Savage and George E. Gehrels	Early Devonian conodonts from Prince of Wales Island, southeastern Alaska	1415
E. G. Nisbet	The continental and oceanic crust and lithosphere in the Archaean: isostatic, thermal, and tectonic models	1426
John Shaw and Donald Kvill	A glaciocluvial origin for drumlins of the Livingstone Lake area, Saskatchewan	1442
R. L. Barnett, M. Arima, J. D. Blackwell, C. G. Winder, H. C. Palmer, and A. Hayatsu	The Picton and Varty Lake ultramafic dikes: Jurassic magmatism in the St. Lawrence Platform near Belleville, Ontario	1460
N. R. Catto	Glacigenic deposits at the Edmonton Convention Centre, Edmonton, Alberta	1473
Ed Landing and Rolf Ludvigsen	Classification and conodont-based age of the Ordovician trilobite <i>Ellaspis</i> (middle Arenigian, Ville Guay, Quebec)	1483
Kenneth Carpenter	Skeletal reconstruction and life restoration of <i>Sauropelta</i> (Ankylosauria: Nodosauridae) from the Cretaceous of North America	1491

NOTE

Richard E. Ernst and Henry C. Halls	Paleomagnetism of the Hearst dike swarm and implications for the tectonic history of the Kapuskasing Structural Zone, northern Ontario	1499
Note of appreciation/Note de reconnaissance		i
Author index for volume 21/Index des auteurs pour volume 21		AI-1
Subject index for volume 21/Index des matières pour volume 21		SI-1
Contents for volume 21/Sommaire pour volume 21		v

